THE RIVER OTTER JOURNAL

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A Short Note From The Editors:

This issue of the River Otter Journal contains abstracts from papers presented at a very special recent event. On 21 September 1994, a Nearctic River Otter Symposium was held in conjunction with the First Annual Conference of the Wildlife Society in Albuquerque, New Mexico. This symposium was the first such meeting since that held in Columbia, Missouri in 1984. This recent meeting was organized by Paul Polechla of the University of Alaska and sponsored by the Wildlife Society, the River Otter Alliance, and the Otter Specialist Group of the International Union for the Conservation of Nature. These papers may be published in the future if enough people are interested in acquiring them. Please give us your input.

Since at this point in time our Journal comes but once a year, we plan to send our members a letter in between publications. This letter would include short pieces of recent news from you to be shared with other members of our group. Information to be included would be otter-related items such as current research programs, conservation programs, educational presentations, requests for information, etc. We also would like more extensive articles for our Journal. In addition to the types of articles we normally include in the Journal, how about sharing some of your humerous experiences in otter-related events. Please become involved by sharing so that none of us feel isolated in our efforts to preserve this precious species.

On behalf of the River Otter Alliance and the river otters, we thank you for your cooperation and your input. Happy Ottering!

Input for the Journal and the Letter can be sent to:
Judy Berg, 9202 E. Evans Way, Denver, Colorado 80231 (303) 368-7540

AYDELOTT, TIMOTHY E., and SUSAN K. MCGUIRE. Water Ecology Research Project: utilizing middle school students to collect ecological data on the Rio Grande in New Mexico. Education Department, New Mexico Museum of Natural History and Science, 1801 Mountain Road NW, Albuquerque, NM 87104 USA.

We utilize middle school students from communities on the Rio Grande and its tributaries to collect water quality and bio-diversity data. We then store the data concerning levels of dissolved oxygen, carbon dioxide, hardness, nitrates and phosphates in a database at NMMNH&S for use by parties interested in those parameters. Students become quite proficient and accurate in their data collection technique and are reliable as field workers to the level of expertise provided by the equipment used. In addition to the environmental awareness and concern fostered in the students involved, they are useful in obtaining field observations.

BALKE, J.M.E., P.J. TSCHAPLINSKI, S.J. COCKFORD and G. SUTHER. River otter predation on juvenile salmonids in winter: preliminary report of river otter scat collection and diet analysis. 6080 Lacon Road, Denman Island, BC, V0R 1T0 CANADA.

Several creeks in the Queen Charlotte Islands (QCI), British Columbia have been identified as sites where the rates of river otter (*Lontra canadensis*) predation on overwintering juvenile coho salmon (*Oncorhynchus kisutch*) and rainbow trout (*O. mykiss*) might be high. A study was undertaken in six watersheds on Graham and Moresby Islands to determine the presence or absence of river otter, to assess the feasibility of collecting analyzable river otter scats in winter and to identify river otter prey species from scat analysis. Over 500 river otter scats were collected from seven creeks during two field trips in November 1992 and February 1993. The bones of adult salmonids were found in scats collected from all of the creeks and shorelines examined in November and this sampling period corresponded with the end of the salmon spawning runs in these creeks. Juvenile salmonid bones were found in the scats from some of the creeks in November and from all creeks sampled in February. Twenty-one fresh samples comprising at least 97 scats from four river systems, contained 347 salmonid otoliths. Ninety-three percent of the otoliths were between 1.5 and 2.5 mm long. When spawning salmon were unavailable, 19 other fresh water and marine fish species/general were identified in the scats. It was apparent that the river otters using these creeks were also foraging in the ocean.

BERG, JUDITH K. River otter population in and adjacent to Rocky Mountain National Park. 9202 E. Evans Way, Denver, CO 80231-3440, USA.

The river otter (*Lontra canadensis*) was reintroduced into the North Fork of the Colorado River in Rocky Mountain National Park between 1978 and 1984, after it was determined to be extirpated in the Park and also declared a Colorado state endangered species. In 1992, a winter survey conducted by the Park estimated that 15 otters were continuing to use this river habitat. This population is the concentration for the current project. The method employed is systematic coverage of this river habitat and adjacent drainages. Otters and their signs are being documented and photographed throughout the year. Thus far, 687 hours have been spent in the field during this continuing project. Preliminary results show that the otters are continuing to use the main channel of the River, three of its tributaries, and four nearby lakes connected to the Rivers' drainage. Otter sightings have occurred at all hours of the day. Scat and bones collected from five different locations show the otters' diet to include fish from the families of Catostomidae and Salmonidae. Information is continuing to be accumulated, the input of which is intended to contribute to this species survival.

BOWYER, R. TERRY, J. WARD TESTA, JAMES B. FARO, and LAWRENCE K. DUFFY. Effects of the EXXON VALDEZ oil spill on river otters in Prince William Sound, Alaska. Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, AK 99775 USA. (RTB, LKD). Institute of Marine Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775 USA. (JWT). Alaska Department of Fish and Game, 3428 Kalifornsky Beach Road, Suite B, Soldotna, AK 99609 USA. (JBF).

Populations of river otters (*Lontra canadensis*) inhabiting marine environments in Prince William Sound, Alaska were adversely effected by the Exxon Valdez oil spill. Otters living in heavily oiled areas (Knight Island) differed significantly from those inhabiting nonoiled areas (Esther Passage) by selecting habitats differently, exhibiting extreme changes in diets, showing large differences in sizes of home ranges, and by expressing differences in body mass and blood values indicative of chronic problems. Population estimates of otters obtained from mark-recaptures methods based on radio-isotope labels of feces did not differ significantly between Knight Island and Esther Passage. Only overwhelming differences in population size, however, would have been detected by this method. This assessment was further flawed by a lack of pre-spill estimates for otter populations Nonetheless, otters abandoned latrine sites at a significantly higher rate from oiled areas than from nonoiled zones from throughout Prince William Sound, suggesting some population-wide effect. Likewise, differences in blood values observed for Knight Island and Esther Passage were confirmed for broad areas of Prince William Sound.

CHILELLI, MARYELLEN, BRAD GRIFFITH, and DANIEL J. HARRISON. Utility of regional furbearer data: the river otter example. Department of Wildlife and National Biological Survey, Maine Cooperative Fish and Wildlife Research Unit, University of Maine, Orono, ME 04469 USA.

River otter (*Lontra canadensis*) harvest and biological data from 13 states composing Region 5, USFWS, 1970-89, were examined to determine temporal and spatial characteristics of the data, assess utility of the data for ascertaining population trends, and provide guidelines for subsequent data collection and analyses. States were consistent in assigning otters to 3 age classes (juvenile, subadult, and adult) based on cementum annuli and radiographs. Use of radiographs improved the consistency of aging as juvenile or nonjuvenile compared to aging by cementum annuli alone. Otter harvests were positively correlated with beaver harvest and with average beaver pelt price from the previous year throughout most of northeastern U.S. Females and juveniles composed a greater proportion of the harvest earlier in the season. Because the proportion of juveniles in the harvest of river otters was related to aging technique, standardized aging procedures should be applied regionally. Counts of corpora lutea and embryos provided consistent estimates of litter size in reproductively active females. However, embryo counts provided higher estimates of pregnancy rate than corpora lutea counts. Catch per unit effort indices should be developed to assess otter population status in northeastern U.S. Combined with J:NJ ratios, CUE may provide the minimum sufficient information for evaluating region-wide river otter population trends.

CRAMER, MARK, S. Kentucky's river otter restoration program. Kentucky Department of Fish and Wildlife Resources, # 1 Game Farm Road, Frankfort, KY 40601 USA.

Nearctic river otters (*Lontra canadensis*) were virtually extirpated from their historic range in the eastern two-thirds of Kentucky through a combination of unregulated harvest, habitat loss, and pollution. In an effort to restore self-sustaining populations of river otters throughout suitable habitat in Kentucky, a river otter restoration project was initiated in 1991. A total of 359 wild trapped river otters were obtained from Louisiana for release in Kentucky. Three hundred fifty-five otters were released at 14 sites, with a goal of 25 per site (15 males, 10 females). Four otter mortalities prior to release were thought to be stress-related. Ten known post-release mortalities included 5 hit by automobiles and 5 which appeared to be stress-related. Two untagged juvenile otters were also hit by automobiles. Reproduction has been verified in 4 of the release areas. It is too early to fully assess the success of this project.

de SILVA, P.K. A message from the Otter Specialist Group, Species Survival Commission, International Union for the Conservation of Nature and Natural Resources. Department of Zoology, University of Peradeniya, Peradeniya, SRI LANKA.

The purpose and function of the Otter Specialist Group, Species Survival Commission, International Union for the Gonservation of Nature and Natural Resources will be discussed.

de SILVA, P.K. The status and the importance of otter conservation in southern and southeast Asia. Department of Zoology, University of Peradeniya, Peradeniya, SRI LANKA.

Four species of otters; Eurasian otter (*Lutra lutra*), smooth-coated otter (*L. perspicillata*), hairy-nosed otter (*L. sumatrana*), and Asian small-clawed otter (*Aonyx cinerea*), are listed as threatened species in the IUCN Red Data book and inhabit wetlands of southern and southeast Asia. They have a restricted distribution except for the Eurasian otter. The wetlands are very important life supporting systems playing a vital role in controlling water cycle, and their well maintenance is important to humans as well as to other animal species. However, the wetlands, especially the marshy areas, are being developed at a rapid rate in the southern and southeast Asian region and thus the habitat of the otters is very much threatened. Otters are indicators of healthy wetlands and are among the first species to disappear when their habitat is polluted or disturbed, and as such they also provide a means of ensuring the healthy nature of the wetlands.

FELBAUM, FRANK H. The homecoming. Pennsylvania Wild Resource Conservation Fund, P.O. Box 8764, Harrisburg, PA 17105 USA.

"THE HOMECOMING" is the first full length video to document the successful reintroduction of the Nearctic river otter. The 57 minute video provides an overview of otter biology and natural history as well as thorough documentation of the processes involved with the development, implementation, and evaluation of the Pennsylvania River Otter Reintroduction project. The video is intended to serve as a tool for educating the public about the plight of the river otter and demonstrates the commitment of the Pennsylvania Game Commission, Pennsylvania Wild Resource Conservation Fund, and Pennsylvania State University to conserve this delightful species in the Commonwealth.

HALBROOK, RICHARD S., and ALAN WOOLF. Assessment of environmental contaminants in North American river otter. Cooperative Wildlife Research Laboratory, Southern Illinois University, Carbondale, IL 62901-6504 USA.

Nearctic river otter (*Lontra canadensis*) environmental contaminant data were used to assess the influence of organochlorine pesticides, polychlorinated biphenyls, and mercury on river otter populations in North America. We surveyed states to obtain the current status of river otters in North America and reviewed otter and mink (*Mustela vison*) environmental contaminant data. These data and tissue concentrations observed in controlled studies of mink and otter were used to hypothesize contaminant tissue concentrations in otter and fish that would be associated with adverse effects. Available data do not substantiate drastic declines in North American otter populations due to environmental contaminants, however, results indicate that otters in some locations in North America have been adversely effected by contaminants. The effect of environmental contaminants on the decline of river otter appear to be subordinate to the effects of human encroachment, habitat destruction, and overharvest. Additional controlled studies and monitoring of environmental contaminants in river otter are a primary management concern especially in light of reintroduction efforts.

HAMILTON, DAVID A., JOHN H. MEYER, THOMAS G. KULOWIEC, and DAVID W. ERICKSON. Status of river otters in Missouri following a restoration program. Missouri Department of Conservation, Columbia, MO 65201 and Jefferson City, MO 65102. USA.

Because the Nearctic river otter (*Lontra canadensis*) had declined to an estimated 70 animals in Missouri by 1934 and showed only slight improvement by 1981, the Missouri Department of Conservation embarked on an aggressive restoration program. Our objective was to re-establish otter populations in all suitable habitats. First, we assessed the survival, movements, interactions, and reproduction of translocated river otters in 2 habitat systems believed to typify the range of environmental conditions suitable for otters in Missouri. Based on favorable results from this research (overall survival of released animals was 81% at the end of 1 year), we developed a restoration plan that outlined habitat assessments, a restoration strategy, and tasks to incorporate into annual work plans. During 1982-1992, we released a total of 845 otters at 43 sites, including 36 different streams and rivers. Otters were live-trapped from wild populations in Louisiana, Arkansas, and Ontario and obtained using trades for wild turkeys. We developed a handling device and a process to efficiently and safely tag otters prior to release. We believe that most releases have been successful in developing viable populations, based on numerous reported sightings, accidental captures by beaver and raccoon trappers (many untagged otters) and continued presence of otter sign in release streams several years after releases were made. This paper also summarizes the post-release information obtained from various release sites.

HANNA, JON D., DAVID W. BELITSKY, and JOHN S. PHELPS. Status of river otters in Arizona. Arizona Game and Fish Department, 2221 West Greenway Road, Phoenix, AZ 85023 USA.

Historically the southwestern river otter (*Lontra canadensis sonora*) occurred in Arizona along the Colorado and Gila rivers and their major tributaries, but their current presence is uncertain. Historical accounts and museum specimens suggest that otters persisted at least into the early 1970s. Unconfirmed reports continue to be received from several localities, but limited surveys in these areas have not documented otter occurrence. Prior unrestricted harvest, habitat alteration, and a dramatic change in prey base and fish fauna may all be contributing factors in the population declines. Otters of the subspecies *L. c. lataxina* from Louisiana were successfully re-introduced into central Arizona 1981-1983. The resulting population, estimated at 15-20 breeding adults, continues to persist along the Verde River and its tributaries.

JACKSON, LAURA S., PAT SCHLARBAUM, RONALD ANDREWS, and TERRY LITTLE. River otter reintroduction in Iowa. Iowa Department of Natural Resources, Nongame Program 1436 255th Street, Boone, Iowa 50036 USA.

Prior to settlement, river otters (*Lontra canadensis*) were common throughout Iowa along major rivers and streams. Over exploitation, pollution of streams, and agricultural activities drastically reduced otter populations so that by 1840 they were considered rare in the state. By the turn of the century few authenticated otter sightings occurred in the interior part of the state. A remnant population remained along the Mississippi River in the northeast part of the state, but the last otter was trapped along the Missouri River in 1929. From 1985 through 1990, the Iowa Department of Natural Resources in conjunction with several conservation groups worked to reintroduce the otter to the state. A total of 222 otters were released in groups of 8 to 23 otters at 11 different sites. During the first year, 16 otters received radio transmitter implants to measure their movement and survival in the state. Over 13 months, survival was calculated as 0.85347 (Mayfield, N=14). Males and females used similar daytime loafing sites. Beaver (*Castor canadensis*) lodges, brush piles and bank dens were the most frequently used sites. Knowing this allowed the state to add a "10 yard rule" to make it illegal to set any trap within ten yards of a beaver den near otter release sites. To continue to monitor the dispersal, reproduction and mortality of otters, the DNR maintains an otter sightings file on Microsoft Works. Sightings are solicited from DNR biologists and received from the public. Through July 1993, over 200 sightings had been reported. The sightings documented reproduction in 23 counties and 42 mortalities. Accidental trapping (n=22) and roadkills (n=12) were the leading causes of mortality.

JOHNSON, SCOTT A. and ROBERT F. MADEJ. Development of a river otter reintroduction program in Indiana. Indiana Department of Natural Resources, 553 East Miller Drive, Bloomington, IN 47401 USA.

The Nearctic river otter (*Lontra canadensis*) occurred throughout Indiana prior to European settlement, but unregulated fur harvest and loss of wetland and riverine habitats resulted in widespread population declines by the early 1900s. Despite legal protection in 1921, river otters were believed to have been extirpated from the state by 1942. We investigated the current presence and distribution of river otter habitat in Indiana and made recommendations for implementation of a statewide reintroduction program. Watersheds in Indiana were delineated into 15 river otter restoration units. Agency personnel (n=22) used stream characteristics, watershed features, water quality, and prey availability to evaluate habitat quality within units, and 49 streams and lakes were recommended for river otter reintroduction. Further evaluation indicate good to excellent conditions for river otters exist in several restoration units, and an experimental release of 25 wild-caught individuals is scheduled for 1995. Results of the experimental release as determined through radiotelemetry, juxtaposition of high quality watersheds, and source of animals will determine the scope of Indiana's river otter reintroduction program.

JORGENSEN, CAROL J. Ethnozoology of the river otter: Traditional knowledge and legends from an Alaskan Native perspective. Native American Fish and Wildlife Society, USDA Forest Service, Regional Office, P.O. Box 21628, Juneau, AK 99802 USA.

This paper will explore the knowledge and legends of the great land/river (*Lontra canadensis*) a highly respected, and in many cases feared animal that has interacted with the Tlingit Indians of southeast Alaska for centuries. It will discuss how Alaska Natives, and specifically the Tlingit Indians of southeast Alaska, as indigenous cultures consciously maintained a balance with nature. More importantly, how through traditional knowledge and relationship with their land and their resources they were governed by ecological relationships which included an intimate spiritual tie to their heritage through balance and respect for all things. This paper is from a traditional perspective on how traditional people relate to their world.

MALVILLE, LESLIE E. Habitat selection of river otters reintroduced to the Dolores River, southwestern Colorado. Department of EPO Biology, University of Colorado, Boulder, CO. 80302 USA (Current address: Dames & Moore Environmental Services Group, 1125 Seventeenth Street, Denver, CO. 80202 USA).

Nearctic river otters (*Lontra canadensis*) were reintroduced to the Dolores River during the fall of 1988 (6 animals) and 1989 (14 animals). River otters were tracked for 14 months through December 1989 by the use of radio transmitters and animal sign. A movement pattern was observed such that some pools experienced much greater use than others, although the pools appeared to be similar in terms of size, depth, and bank cover. This observation instigated a habitat comparison study in which ten high-use and ten low-use pools were analyzed for differences in size, bank cover, food resources, substrate, current, above-water boulders, and beaver (*Castor canadensis*) bank dens. Results determined that high-use pools were utilized an average of 19.9 days while low-use pools were utilized an average of 2.7 days (ANOVA, $P > 0.0001$). The pools were found to be statistically similar in terms of pool length (High-use = 176 m, Low-use = 140 m), average depth (High-use = 124 cm, Low-use = 125 cm), as well as with water current, bank vegetation, substrate, and crayfish populations. Significant differences were found between the pool groups in the number of beaver bank dens (High-use = 28.1, Low-use = 10.3) and the number of above-water boulders (High-use = 7.3, Low-use = 2.7). This selective use of pools with high number of beaver dens suggests a beaver-facilitated commensalism, which is consistent with results from other river otter studies.

MATSON, GARY M. Histological standards for tooth sections used to determine the cementum ages of mammals. Matson's Laboratory. Milltown MT 59851-0308 USA.

The capability to distinctly observe microscopic annuli during cementum aging is greatly affected by laboratory histological processing methods. Examples of acceptable and unacceptable technique are given for: Methods of preparing teeth for laboratory processing, microtome sectioning, and tooth section staining. Distinct visualization of annuli is possible when acceptable histological techniques are used, but may be impossible if techniques are unacceptable.

MATSON, GARY M. Histological characteristics of cementum annuli in river otter tooth sections. Matson's Laboratory. Milltown MT 59851-0308 USA.

Accurate cementum aging is dependent upon the ager's knowledge of species-specific cementum annuli differences. River otter (*Lontra canadensis*) tooth sections are difficult to age because of characteristics unique to the species. I standardized the river otter canine cementum aging model by describing and illustrating annulus characteristics, sources of aging error, and representative age classes. Consistent application of the model permitted age determination with acceptable precision.

PENROD, BRUCE D. and E. M. ERMER. Public involvement in a decision to reintroduce river otters into western New York. New York State Department of Environmental Conservation, 6271 Coon Road, Bath, NY 14810 USA. (BDP). New York State Department of Environmental Conservation, 128 South Street, Olean, NY 14760 USA. (EME).

Public input was solicited concerning the reintroduction of river otter (*Lontra canadensis*) into Western New York. The objectives were to answer two questions: 1) Is there sufficient public support to go forward with an otter reintroduction program? and 2) What issues and concerns need to be addressed if a program is undertaken? Responding to written invitations, sixty individuals representing more than twenty stakeholder groups attended three river otter task force meetings. Stakeholder groups represented included Trout Unlimited, Izaak Walton League, trappers, county and state sportsmen organizations, educators, naturalists, fish culturalists, and zoos. The outcome of the meetings demonstrated widespread, but conditional, approval. Funding was the major issue. Strong sentiment was expressed that non-traditional funding sources be developed and that existing natural resource programs not be infringed upon. Fishermen and naturalists expressed concern for the impacts of otter on endemic species, including threatened or endangered species. Trapper organizations asked to be involved in any changes made with trapping regulations in otter release areas. The public participation process greatly enhanced the ability of key publics to make an informed wildlife management decision. Stakeholders now have a sense of ownership of the program and will assist in the resolution of public concerns regarding funding and other social issues.

PETERSON, CAROL S. A message from the River Otter Alliance. 6733 S. Locust Ct., Englewood, CO 80112 USA. (CSP).

The River Otter Alliance promotes the survival the nearctic river otter (*Lontra canadensis*) through education, research and habitat protection. We support current research and reintroduction programs, monitor abundance and distribution in the United States and educate the general public through our newsletter, the River Otter Journal, on the need to restore and sustain river otter populations. Our goal is to be a center of communications between state wildlife biologist, environmental organizations, fishermen and all interested otter lovers on a national and international basis in order to ensure the healthy future of the Nearctic River Otter.

POLECHLA, PAUL J. Jr., Opening address. P.O. Box 368, Kuskokwim Campus, UAF, Bethel, AK 99559 USA.

This historic symposium highlights the contributions to the knowledge of the ecology and management of the nearctic river otter (*Lontra canadensis*), one of 13 species of otters. An overview of the conference with the number of people contributing, number of contributing states, provinces, and countries, range of agencies represented, and range of topics covered will be given. Major contributors to the understanding of otter ecology as well as organizations involved with the conservation of otters will be cited.

POLECHLA, PAUL J. Jr., A review of the nearctic river otter in southwestern North America: Ethnozoology, distribution, ecology, and taxonomy. Natural History Museum, Eastern New Mexico University, Portales, NM 88130 USA (Current address: P.O. Box 368, Kuskokwim Campus, UAF, Bethel, AK 99559 USA).

The ethnozoology, toponymy, distribution and relative abundance, altitudinal occurrence, diet, ecology and taxonomy of the nearctic river otter (*Lontra canadensis*) in southwestern United States (California, Nevada, Utah, Wyoming, Nebraska, Kansas, Colorado, Arizona, New Mexico, Texas, and Oklahoma) was studied. Study methods included a literature search of biological and anthropological references, cartographic analysis, museum questionnaires, examination of anthropological museum artifacts, and visitation of verified otter localities.

POLECHLA, PAUL J., Jr., and TAUNI L. RODGERS. Cranial and dental anomalies of the nearctic river otter and sea otter in Alaska. Kuskokwim Campus, University of Alaska-Fairbanks, Bethel, AK 99559 USA. (PJP). Department of Biology and Wildlife, University of Alaska-Fairbanks, Fairbanks, AK 99775 USA. (TLR).

Samples of skulls of nearctic river otter (*Lontra canadensis*) and sea otter (*Enhydra lutris*) housed at the University of Alaska Museum were examined. The skulls were inspected for the presence/absence of cranial and dental anomalies such as plagiocephaly, bregmatic bones, heterotopic bones, exostosis, porous bone, alveolar thinning, congenital agenesis, irregular placement, supernumerary teeth, worn dentition, and caries. The frequencies of occurrence of each anomaly were compared to see if there are any interspecific differences attributable to genetic or environmental factors.

POLECHLA, PAUL J. Jr. Closing remarks. P.O. Box 368, Kuskokwim Campus, University of Alaska-Fairbanks, Bethel, AK 99559 USA.

To close the formal portion of the symposium, a brief synopsis of the papers presented will be given.

POLECHLA, PAUL J., Jr. Nearctic river otter in Alaska: A review. Kuskokwim Campus, University of Alaska-Fairbanks, Bethel, AK 99559 USA.

A literature review of the Nearctic river otter (*Lontra canadensis*) was performed. Accounts of river otters in early explorerjournals, regional faunal surveys, early and modern fur trade records, radiotelemetry/behavioral studies, habitat use studies, and possible range-extension notes were examined and summarized.

SERFASS, THOMAS L., and R. P. BROOKS. River otters in Pennsylvania: a model for predator reintroduction. School of Forest Resources, Forest Resources Laboratory, The Pennsylvania State University, University Park, PA 16802 USA.

To be successful, wildlife managers should consider both ecological and sociological factors during development and implementation of predator reintroduction programs. Since 1982 the Pennsylvania River Otter Reintroduction Project has applied this comprehensive approach to successfully reintroduce river otters (*Lontra canadensis*) to 5 watersystems in northcentral and western Pennsylvania. During this project, we identified 6 key developmental and implemental stages that can contribute to a successful, publicly supported reintroduction project: 1) site selection, 2) identification and selection of appropriate sources and numbers of animals, 3) capture and handling, 4) veterinary care, captive management, and translocation, 5) public relations and education, and 6) post-translocation monitoring and evaluation. Lessons learned during the project can serve as a model for developing and implementing predator reintroduction programs.

SHANNON, J. S. Onset of self sufficiency in free-ranging otters. Department of Biological Sciences, Humboldt State University, Arcata, CA 95521, USA.

The onset of self sufficiency in young furbearers has direct implications for management. Since 1983, I have observed a marine coastal population of the nearctic otter (*Lontra canadensis*) at Trinidad Bay, California. From 1986-1992, I chronicled the development of 6 litters (22 pups) by the same mother, and 4 litters (9 pups) by that mother's daughters. Pups were born around 1 April. Pups achieved proficiency in aquatic locomotion by week 20, but proficiency in aquatic hunting required >20 additional weeks of learning. Six-month-old pups still depended entirely on food provided by the mother. Self sufficiency was attained during weeks 37-42 (late December-early January), when the mother stopped providing food directly to pups. The young were abandoned by their mother at 48 weeks. Although prey capture techniques were learned by individual trial-and-error, the crucial logistics of foraging and habitat utilization were learned entirely from the mother. Removal of the mother before pups attain self sufficiency can only have a negative effect on recruitment. Therefore, conservation/management practices should be avoided that would remove a mother before her pups are 9 months old. Such practices include autumn harvest seasons, and April-December captures for translocation.

SPELMAN, LUCY H. Anesthesia of Nearctic river otters. College of Veterinary Medicine, North Carolina State University, Department of Companion ANIMAL AND Special Species Medicine, 4700 Hillsborough St., Raleigh, NC 27606 USA.

Nearctic river otters (*Lontra canadensis*) were anesthetized in cooperation with the North Carolina Wildlife Resources Commission Otter Restoration Project in 1991-94. Seven anesthetic protocols were evaluated in 180 otters:ketamine,ketamine-midazolam,ketamine-medetomidine-atipamezole,ketamine-zylazine-yohimbine,telazol, fentanyl-azaperone-naloxone, and isoflurane. All otters received a physical exam, complete blood count and biochemical panel. Heart rate, electrocardiogram, respiratory rate, rectal temperature, indirect blood pressure, and pulse oximetry were monitored throughout anesthesia. Although the cardiovascular status of anesthetized otters was more stable with isoflurane, the injectable agents offered the advantage of less struggling during induction and minimal requirements for field equipment. The following are recommended for anesthetic induction prior to inhalation anesthesia or for procedures of 25 min or less: ketamine (10 mg/kg)-midazolam (0.25 mg/kg) or ketamine (2.5 mg/kg)-medetomidine (25 ug/kg)-atipamezole (100 ug/kg). Anesthetic reversal is the primary advantage of medetomidine-ketamine and this combination is preferred in otters intended for immediate release post anesthesia. Ketamine (10 mg/kg) alone produced short term anesthesia characterized by variable respiratory depression and poor myorelaxation. Myorelaxation was adequate with telazol (4 mg/kg) but recoveries were prolonged. Xylazine (1-2 mg/kg)-ketamine (5-10 mg/kg) should be used only if other agents are unavailable due to inadequate immobilization at low doses and significant apnea, hypotension and hypoxemia at higher doses. Fentanyl (0.1-0.2 mg/kg)-azaperone (0.2 mg/kg), effective in sea otters (Enhydra lutris), was associated with clonic contractions and apnea and is not recommended for use in river otters.

SUMNER, PERRY W. Techniques utilized and developed for the restoration of river otters in North Carolina. North Carolina Wildlife Resources Commission, P.O. Box 15479, New Bern, NC 28561-5479 USA.

In an effort to restore Nearctic river otters (*Lontra canadensis*) to their historic range in western North Carolina with limited funding and manpower, it was necessary for North Carolina Wildlife Resources Commission Furbearer Project personnel to modify existing techniques and develop new techniques for trapping, handling, housing, and transporting river otters that would be efficient and practical and result in successful reintroductions. To date, 178 river otters have been successfully reintroduced to 7 western North Carolina watersheds since 1990. Overall trapping success was 30 trap nights per otter and 94 percent of all otters captured and handled using the described techniques were released in good condition. Trap related injuries were relatively minor and were usually healing well prior to release. None of the otters captured with leg hold traps damaged their teeth from health characteristics with individuals from several age classes being sampled. Total Alkalinity, Total Suspended Solids, pH and rainfall were recorded for an eight month period, five years after initial reclamation. The health of the fish community and the stability of the parameters indicate the methods employed were successful in reclaiming boxcut spoils. This reclamation was awarded state wide recognition with the 1993 excellence in reclamation achievement award. It has also been nominated for the 1994 Office of Surface Mining national award for reclamation excellence.

Mitigating For Lost River Otter Habitat In Idaho: Clearwater River Otter Research Completed.

By Curt Mack

The Nez Perce Indian Reservation encompasses approximately the first 80 miles of the lower end of the Clearwater River. The construction of the Dworshak dam on the Reservation inundated 53 miles of the Northfork Clearwater River and irreversibly destroyed important riparian habitat. To mitigate for this loss of habitat and associated impacts to wildlife resources, the Bonneville Power Administration provided funding for the Nez Perce Tribe to collect baseline data including distribution, movements, diets, and habitat use of river otters in the Clearwater River drainage centered within the Nez Perce Indian Reservation. The project, initiated in 1991, was just recently completed this past summer. Results of the study will now be used to develop plans to enhance riparian habitats along the Clearwater River for river otters.

The data we collected suggested river otters were common and occurred throughout the basin. In addition, sign surveys and latrine site surveys suggested otters were abundant and year-round residents occurred along the Clearwater River and its larger tributaries throughout the Reservation.

Movements of otters were determined by radiotracking otters implanted with radio transmitters. Male otters moved extensively, while female otters limited their movements to small sections of the river. Male otters maintained larger home ranges and moved greater daily distances than females during all seasons of the year. The average home range length for male otters was 66 miles, compared to 16 miles for females. On the average, male otters traveled about 8 miles every day, comapared to only 1 mile per day for females. Home range lengths of male and female otters showed little seasonal variation. A trend toward larger spring and summer home range lengths, compared to fall and winter, was observed for male otters. Home range lengths tended to be smaller in winter and spring than summer and fall for female otters. Increased movements observed for males during the spring and summer probably related to adult males seeking breeding females. Minimum spring and maximum fall movements observed for adult female otters was probably related to the females being tied closely to the natal den area during early pup rearing, and increasing their movements as the pups developed through summer and fall.

Interestingly, male river otters in the Clearwater River appeared to be quite social, exhibiting extensive home range overlap between males and females. Although home ranges of instrumental female river otters overlapped spatially, breeding female otters remained solitary, and did not associate with neighboring adult female otters. Male otters, on the other hand, exhibited both spatial and temporal home range overlap, frequently traveling in all male groups.

Movements of otters (especially males) in the Clearwater River are some of the most extensive recorded in river otter studies. Although the Nez Perce Reservation encompassed almost 100 miles of the Clearwater River and its tributaries, our findings indicated that the Reservation does not encompass an entire population of otters. In fact, a group of five male otters traveling together maintained a home range that nearly included the entire length of the Clearwater River within the Reservation - about 80 miles. Although the Reservation supports a core number of breeding otters, it is evident there is frequent movement and interchange of individuals between other population centers throughout the drainage.

During the course of the study, we also gathered information on food habits of otters. Diets of river otters in the Clearwater River were determined by identifying all prey remains in the collected scat. Otters ate fish, invertebrates, birds, and mammals. Not surprisingly, fish comprised the majority (79%) of the diet. Crayfish were the only invertebrate identified and also comprised a substantial (20%) proportion of the sample. Birds (0.4%) and mammals (0.6%) were considered infrequent food items of otters in the Clearwater drainage.

When only considering fish eaten by otters, suckers were most frequently recorded, comprising 42% of all identified fish species. Trout was the next most frequently recorded fish group, comprising 27% of identified fish prey remains. Sculpins (13%), minnows (10%), and bass and sunfish (8%) were recorded less frequently. Although crayfish were observed in only 24% of the scats sampled, they ranked second in frequency of occurrence behind suckers (33%) with trout comprising the third most frequent (21%) prey item, when considering proportions of fish and crayfish in the sample. Diets of river otters in the Clearwater River changed according to the seasonal availability of the three most common food items. Otters foraged most heavily on trout during the spring. During the summer months, otter diets consisted mostly of crayfish. Otters preyed most frequently on suckers during the fall and winter.

(continued on next page)

Clearwater River Otter Research (continued)

The main objective of our study was to try to identify important habitats for river otters in the Clearwater River. The Clearwater River corridor has been extensively altered by human development. The river was channelized in places by diking backwater sloughs and side channels and much of the shoreline has been riprapped from the construction of a state highway and railroad which run along opposite sides for the entire length of the river. In addition, the river receives high recreational use from residents of the many towns along the river corridor.

Consequently, shorelines are predominantly rocky and the riparian zone is narrowly confined between the highway and railroad and is poorly developed. Over 70% of the shoreline is composed of either gravel and cobble (36%) or riprap (35%). Sandy or organic soils compose only 5% of the shoreline. Generally, 75% of the shoreline is either unvegetated or only sparsely vegetated.

Shoreline otter habitats along the Clearwater River are characterized by long reaches of unsuitable or marginal habitat punctuated by isolated, small pockets of suitable habitat. These isolated "insular habitats" may be vital in maintaining otter numbers in the Reservation as otters key in on these areas for foraging, denning, grooming, and pup rearing. Insular habitats occurred where bank substrates were suitable for denning and latrine sites. Otters in the Clearwater River chose sites for dens and latrines based on the suitability of bank substrates more than any other habitat variable measured during this study. Instrumented river otters used 124 different dens and 50 different latrine sites during the course of the study. Not surprisingly, river otters in the Clearwater River used more (63%) rock cavities than any other den types and most of these (43.6%) were located in riprap. Latrine sites were associated most frequently (58%) with either sand or riprap bank substrates.

Although riprap was the most common bank substrate selected for denning and latrine sites, not all riprap types were suitable. Riprap consisting of small, consolidated fill materials was not used by otters. Riprap composed of large

loosely plied, boulder-sized rock (large riprap) provided many benefits for otters. The large size of the fill material was more attractive to otters for haul out sites. The large interstitial spaces of the loosely plied rocks provided suitable denning cavaties and cover for otters. Frequently, large riprap sites would project out into the river as an obstruction, creating an eddy with an associated sand bar on the downstream side, which provided foraging and grooming areas. The availability of suitable bank substrates may be an important habitat consideration in limiting the number of otter den sites along the Clearwater River. Although most (88.4%) shorelines were rocky, only approximately 16% of the study area contained suitable rocky substrates for otter den sites, and organic bank substrates occurred in only 5% of available shorelines along the river.

Instrumented river otters spent the majority of their time along the mainstem of the Clearwater River. Although tributary habitats received less frequent use by otters, tributaries were considered important in providing movement corridors and maintaining connectivity between other otter populations in the drainage and providing natal den and pup rearing habitats. One instrumented female otter established a natal den in an isolated small tributary which she used for three consecutive years during our study. Once her pups were old enough to leave the den, she would move them down to the mouth of the tributary where the family group predominantly used side channel and backwater slough habitats.

The findings of this study were instrumental in developing recommendations for protecting and enhancing river otter habitats in the Clearwater River. We identified specific reaches along the mainstem of the river that included insular habitats that should be protected, or degraded backwater slough habitats that should be restored. We also identified and prioritized tributary habitats to be protected or enhanced to maintain movement corridors, provide natal den and pup rearing habitats, and restore degraded habitats. We look forward to the successful implementation of these recommendations to help insure the persistence of a healthy river otter population in the Clearwater River.

Update on the Proposed Bridge to the Isle of Skye, Scotland

Editor's Note: The concern continues over a proposed bridge which would join the Isle of Skye with the Scottish mainland, and thus, negatively affect the otters in the area. Please refer to The River Otter Journal, Vol. III, No. 1, Fall 1993 for background information. Following is a recent summary update:

To: The River Otter Alliance
From: Veronica Stevens, The Scottish Otter Association

I would like to update you on what has happened in the Isle of Skye Controversy. The main work has been done under the auspices of a special fund called "Save the Otters of Scotland" set up under 'Advocates for Animals' in Edinburgh. This is primarily to try and have the European Union Laws on the STRICT PROTECTION of otters and their places of rest and shelter upheld. This is based on the Bern Convention on the conservation of European Wildlife of 1979, which has been translated into law by each member state of the European Union into its national laws. In the UK this is The Wildlife and Countryside Act of 1982.

It may be of special interest to your members that a Canadian lecturer in law at the University of Glasgow, Alex Black, has compared the case of the Skye Bridge and the otters with legal practice in North America (both USA and Canada) and he concludes that we have a lot of catching up to do here in Europe. For example in the UK, we the public are personally financially liable here, there is no-one authorized to sue on behalf of the otters. Environmental law is far more advanced in North America. Alex Black has written this up and I will send you a copy of his paper. It is entitled "Environmental Impact Assessment & The Skye Bridge: An Abuse of Legal Process.

Thank you for your good wishes for the otters of Eilean Ban. I would be grateful if you could let people in The River Otter Alliance know what is happening in Scotland to the otters.

Thank you for your attention.
Yours sincerely,

Veronica Stevens

Scottish Otter Association

MEMBERSHIP FORM

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Enclosed is my tax-deductible check.

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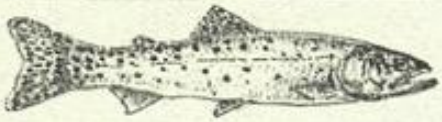

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THE RIVER OTTER ALLIANCE

The River Otter Alliance is a non-profit, tax exempt group which is organized to promote the survival of the North American river otter (Lutra canadensis) through education, research, reintroduction, and habitat protection.

All work and efforts for this organization and newsletter are on a volunteer basis by those who share a common concern for the welfare of the river otter and its habitat. We invite all interested persons to contribute their time at any level of the organization.

THE RIVER OTTER ALLIANCE
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